Mediational Strategies for Deaf Students:
Implementing Feuerstein's Instrumental Enrichment
To Address Cognitive Deficits

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The North Carolina School for the Deaf in Morganton, NC is a residential school serving students K-12 in the western half of North Carolina. There are approximately 200 students on campus; some one third of these are day students. For all but a handful, hearing loss is the primary handicapping condition, with losses ranging from moderate to profound. A high number of students have learning delays and difficulty in accessing the NC Standard Course of Study as prescribed for each grade and content area.

Two years ago, we began implementing a systematic approach to teaching cognitive skills throughout the middle school. We chose Feuerstein's Instrumental Enrichment (FIE), developed by Reuven Feuerstein (1980). Feuerstein posited the theory of Structural Cognitive Modifiability, the belief that intelligence is not fixed or static. He has stated that changes can be effected within a person that will alter the course of the individual's future cognitive development. As a means of achieving this, the FIE program he developed focuses on providing Mediated Learning Experiences to accomplish pervasive changes in the student's capacity to learn. Feuerstein has described Mediated Learning Experience as an instance where a teacher, parent, or caregiver presents and interprets an experience for a child in a meaningful way. There is intent to highlight particular aspects of the learning experience and engage the child in extracting new applications for future and paper tasks designed to engage the child in activities that will present opportunities for this mediation. There is a high component of teacher/student interaction and the tasks target a wide range of cognitive functions. An FIE lesson always involves the key elements of discussing work to be done, analyzing given information, formulating a plan, using a variety of strategies to execute the plan, and checking the work.

In addition, with our younger students and students with special needs, we chose to use the Cognet program developed by Kathy Greenberg (1999). This program follows the same principles as the work of Feuerstein, addressing cognition in a broad format and providing opportunities to coordinate skills with any content curriculum. The Cognet approach is centered on ten Building Blocks of Thinking and eight Tools of Independent Learning.

Using these two programs has allowed our staff to incorporate a common vocabulary across all ages and content areas in the school. Teachers of kindergarten students, in conversation with high school teachers, have the same understanding of cognition. Although we are not presently using FIE beyond eighth grade, the theory of Mediated Learning Experience, along with the belief that all children can learn, is a fundamental part of our school wide philosophy. Our focused efforts in FIE are in grades five through eight and all students receive a minimum of three hours of FIE instruction each week. These lessons are further reinforced and extended by all teachers in the course of content area instruction.

A year ago, a number of teachers in the middle school began to ask about the possibility of writing cognitive based goals and objectives for their students' Individual Education Plans. The hope was that we would identify the underlying causes of our students' academic difficulties and find new ways to remediate these.

We met in teams composed of the student's teachers along with auxiliary personnel such as the speech language pathologist, the reading resource teacher, the school guidance counselor, and the educational evaluator. The team began by looking at each student's present level of performance, considering strengths and areas of need. We talked in terms of what the student "looked like" in the classroom, what he or she was able to achieve and what was needed to make optimal progress. Instead of working from subject areas such as math or language arts, we concentrated on general cognitive skills that affect learning in all areas.

We first examined the Cognet Building Blocks of Thinking. From these, we chose to focus on the following as a starting point.

> *Approach to task-* systematic versus impulsive exploration, planning, working step by step
> *Understanding of basic concepts of time and space along with verbal tools for these –* important in giving and following directions
> *Thought integration-* pulling together, and using at the same time, multiple sources of information that are part of a given event (considering things as an organized unit rather than in piecemeal fashion)
> *Selective attention-* selecting between relevant and irrelevant information
> *Connecting events-* connecting past, present and anticipated situations, and transferring knowledge to new tasks (the opposite of episodic grasp of reality)
> *Working Memory-* enlarging the thinking space to enter bits of information, retrieve information stored in the brain and make connections among information stored
> *Getting the Main Idea-* finding the fundamental element that related pieces of information have in common (determining what is most important in order to work with information in a more efficient manner)

These gave a clear framework for our first look at the areas in which students experienced difficulties. We selected these because they seemed most necessary for success and also because many of our students evidenced pervasive deficits in these areas.

<p style="text-align:center">Cognitive Deficiencies at the Input, Elaboration, and Output Phases</p>

Teachers then looked at the specific cognitive deficiencies Feuerstein has defined (1980). Feuerstein has chosen to categorize these into three dimensions, or phases, of the mental act: input, elaboration, and output. As we had done with the Cognet Building Blocks, we focused on those we felt most hindered the learning of our students. Nine stood out-- three that manifest at the input phase, four at the elaboration phase, and two at output.

Input deficiencies seen as most problematic were 1) blurred and sweeping perception; 2) unplanned, impulsive, unsystematic exploratory behavior; and 3) impaired receptive verbal tools and concepts.

Blurred and sweeping perception is seen in imprecise details, poor clarity, and a haphazard, hurried, impulsive approach to work. Students may not read directions and do not develop steps for beginning a task or for asking for help when needed. With unplanned, impulsive, unsystematic exploratory behavior, the student lacks an information gathering system, does not routinely read directions, look for commonalities, or summarize. Many students have problems because they have

impaired receptive verbal tools. Because of insufficient vocabulary, they misunderstand words in problems and directions as well as in general subject content.

The elaboration phase involves what we do with data collected. It is the heart of problem solving. Teachers saw the following as particularly problematic for our students: 1) lack of, or impaired, planning behavior; 2) narrow mental field; 3) episodic grasp of reality; and 4) lack of, or impaired, need for pursing logical evidence.

 The first of these involves bridging between the present and the seemingly non-existent future. Students with deficient planning behaviors have difficulty setting goals and determining steps to reach these. They lack organization and do not follow steps to achieve goals. When narrow mental field is evident, students are unable to remember and manipulate multiple pieces of information simultaneously. As they try to deal with a new piece, they lose earlier information. They depend on concrete rather than abstract thinking and often have difficulty following complex directions. Episodic grasp of reality is perhaps the most devastating of the cognitive deficiencies. When it is present, the individual views each object/event as a unique, isolated phenomenon. Something learned in one setting is seen as applicable to that setting only. It isn't obvious to the student that correct grammar will be important in a social studies paper as well as in an English composition. A child may not see the need to apply knowledge of fractions in computing measurements to reduce a recipe. This can manifest as a behavioral problem as well when students don't see the relationship of cause and effect between their actions and the consequences of those actions. Students who have a lack of, or impaired need for pursuing logical evidence do not seek explanations for incompatibilities. They may simply say, "Because," when asked to give a reason. Things appear to them to "happen" without reason. They do not connect events or establish relationships. Asked why they like a particular movie or school subject, they often respond with a tautological answer, "It's my favorite!" The notion of supporting thoughts with logic is unfamiliar to them. They do not expect things to make sense.

In the output phase of the mental act, we state the answer, complete the paper, solve the problem, or make the decision. The two deficits most prevalent at this level were 1) egocentric communication modalities and 2) trial and error responses.

Students with egocentric communication modalities see things only from their own perspective. They therefore do not provide enough detail, precision, or argumentation. They assume that the listener knows what they know and they expect others to read their minds. A student may begin an elaborate narrative without first explaining that this is the plot of a television show. The student may give directions to a school visitor saying that the library is located "where the guidance room was last year." With trial and error responses, students are distracted by irrelevant information and answer quickly with what appear to be random guesses. There is no system for achieving goals. If one answer isn't correct, they immediately substitute another, without reflecting on the source of the error. Impulsivity plays a big part in this, as does lack of confidence. Students often feel that there is one right answer to every question and that it is their job to continue guessing until they happen to hit upon it.

Categories of Deficits

Teachers discussed these deficit areas, defined them, and composed goals that addressed needs as they presented in individual students. Up to this point, teachers had been thinking in somewhat general terms regarding classes of students. It is interesting to look at what happened

when teachers actually completed their Individual Education Plan goals for the middle school students. Of the nine areas prioritized, a need to address verbal tools was present on ninety percent of the students' Individual Education Plans. After this, the next four areas that came up repeatedly were episodic grasp of realities; lack of, or impaired, planning behavior; unplanned exploratory behavior; and trial and error responses. Next were narrow mental field and egocentric communication modalities. Mentioned less often were blurred and sweeping perception and lack of, or impaired, need for logical evidence.

Looking at the broader factors inherent in these deficits, teachers categorized them into the following five areas: 1) those that relate strongly to lack of verbal mediation, 2) those that are connected to over dependence on visual cues, 3) those involving impaired planning abilities, 4) those related to temporal issues, and 5) those that are more behavioral or affective in nature.

As stated previously, the basic canon of the FIE program is the concept of Structural Cognitive Modifiability and its practical application through Mediated Learning Experience. In examining the population at our school, it is clear that there are potentially several reasons that may account for the deficits they experience. First, children who are deaf are affected by the initial sensory deprivation, lacking auditory input to different degrees. This is compounded by other factors; language issues severely limit exposure to much of the culture since only a small percentage of the population knows sign language. Alex Kozulin (1998) has stated that many students who are deaf fit into the most severely limited group in terms of guidelines he proposes in regard to classifying need for mediation. In general, many of the tools for learning are absent and there is inadequate access to Mediated Learning Experience as well.

Possible Causes of Inadequate Mediated Learning Experience

Most obviously, students who are deaf receive less exposure to verbal mediation. They may not be identified as deaf until after the age when children normally begin to speak. Their parents or other caregivers often do not attain strong skills in sign language and may be only able to provide them with cursory instructions or explanations. Even when students are enrolled in classes with teachers who are fluent in sign, they may be given abbreviated explanations. They are not privy to overhearing conversations between adults and therefore do not have the variety of conversational models most children have.

Because of the absence of auditory input, students who are deaf are often said to be highly visual learners. This can be a strength, but can also be problematic. When students are hypersensitive to visual stimuli, they may not discriminate between relevant and irrelevant cues and may attend equally to whatever is in their visual field. This appears also as blurred and sweeping perception with little regard for details and precision.

Closely connected to problems with the use of verbal tools are impaired planning behaviors and lack of orientation toward the need for logical evidence. These may be present because students have not had the opportunity to observe the thinking processes of adults in their environments.

Temporal concepts may also be deficient and require mediation. Students who are deaf tend to be oriented more to the present and to have difficulty with mentally projecting the past and future. This may relate to their heavy dependence on visual stimuli. With this deficit, they are limited to what they can perceive in the immediate environment; it may also cause problems with sequencing in problem solving. This presents itself also as episodic grasp of reality. Events seem to happen in isolation; connections are not evident.

Finally there is the category of phenomena that can be attributed to inadequate mediation of challenge, of feelings of competence, and of regulation and control of behavior. These are not specific to the handicapping condition of deafness, but are often prevalent with children who have special needs. Because of inappropriately low expectations on the part of their parents, teachers, and sometimes society in general, these students may be allowed to exhibit more immature behaviors than would normally be tolerated at their age level. They are often overprotected and may not be encouraged to be independent. For many caregivers, it may seem easier to do a task themselves than to explain it to the child. The tendency toward passivity on the part of the child may be a consequence. Likewise, giving in to the child's demands may require less energy and interaction than explaining why the demand was denied, particularly if the caregiver's mastery of sign language is inadequate to the task of providing clear and detailed explanations for rules and consequences.

Mediational Strategies

According to Kozulin in "The Diversity of Instrumental Enrichment Applications,"(1998), what is missing in the majority of studies of FIE with the deaf is an analysis of the mediation strategies specific to this population. The following strategies are suggested with the intent of addressing this need. These are arranged according to the five categories our teachers outlined and are a compilation of mediation strategies teachers have found to be successful.

One strategy useful with students who are deaf and who have inadequate verbal tools is that of initially highlighting new or important vocabulary given orally. This can be done by enhancing the facial expression and the intensity of the sign as the word or phrase is presented. Sign language is a conceptual language, rich in its ability to convey a complete range of expression from the scientific to poetic. However, it is not a written language and one sign often may be used to express several different English words. The sign, therefore, should be accompanied by clear finger spelling of the term. As a follow up, students can be provided access to written referents. When new terms are introduced in a classroom or some other setting, they should be displayed in a prominent place where students may refer to them as needed. Mediation related to verbal tools will address cognitive deficits across the input, elaboration, and output phases of the mental act. As students become more facile in manipulating their environments verbally, they will also be better equipped to handle complex problem solving that requires them to categorize using super ordinate terms and to use interiorization as a strategy.

In working with students who have problems with visual distractions, the mediator may initially choose to restrict the student's visual input, for example, by covering portions of a page, by highlighting a particular passage, or by motor focusing. Attending to information in print is not the only strategy that must be developed however. It is also critical that students visually attend to the speaker. When their attention is diverted due to distractions, they are not receiving lesson input as their hearing counterparts would. In lower grades the speaker in a classroom will likely be the teacher or assistant. As learning moves from concrete manipulation to more abstract applications, students must increase their levels of participation and discussion. Particularly in higher grades, the task of attending becomes more difficult. Students must continually shift their eye gaze. Initially teachers will need to cue students to do this. As students become more aware and able, they should take control, self-regulating their visual input and attending behaviors as necessary in response to the complexity of particular tasks and the variety of interactions.

When planning behaviors are absent, students need constant modeling and opportunities to incorporate these skills. Practically speaking, this translates to involving students in the process of planning, and to explaining "why?" (making thinking processes explicit), and asking students "Why?" (requiring reasoning). These are skills that can be fostered at an early age. A fifth grade class of eight students at our school planned and prepared a Thanksgiving meal for themselves and their invited guests. The activity spanned several weeks as students drew up a guest list, determined the menu, computed quantities to buy, and purchased the food items. Each part of this process was involved. Students began with determining the guest list. They suggested inviting their friends, their parents, and their parents' friends. Their teachers first encouraged brainstorming. Then they helped the students examine each possibility and make projections about what would follow if they chose this option. This evaluation process made clear the need to limit the number of guests. The class decided they would each invite one person. From an efficiency standpoint, teaching in this manner would be a poor model. However, the activity was imbued with meaning. The process of planning was made explicit. Students completed the process by actually shopping for ingredients, cooking and serving the meal, and cleaning up afterwards. Practice with this strategy can occur as students work on determining a plan for solving a word problem in math, for writing a report in social studies, for solving a jigsaw puzzle. Guest speakers can talk to the class and describe how they use planning in their work. The football coach may explain plans for setting up a practice session, a maintenance worker may detail a plan for repainting a room, a parent may explain how plans are made for a family vacation. As students see planning as a part of real life situations, they will become more invested in using this strategy.

Mediators can address temporal problems and those related to episodic grasp of reality by calling attention to how new information connects with what was previously learned. Teachers in our middle school now routinely ask students to compare the work they are about to begin to the work they completed the previous day. Students are often asked to begin by scanning their work for a fixed amount of time, generally about two minutes, to see how the task is related to previous learning. Soon this comparison becomes habitual and internalized. Students initiate this process themselves. Another useful mediation tool in addressing such problems is that of verbal rehearsal. This has been demonstrated in work with the Complex Figure Drawing subtest of Feuerstein's Learning Propensity Assessment Device. When, in correlation with the use of appropriate spatial terminology for organizing the parts, students repeat the steps they will follow in drawing the figure from memory, their performance of the final memory drawing improves dramatically. Verbal rehearsal can also be used in describing how to solve a math problem or in listing the steps needed to fix a simple meal. Teachers can routinely require students to articulate a plan before beginning to work. When this is done as a matter of course, it becomes an ingrained tool.

The final category, related to behavioral, affective issues, is particularly challenging. Raising expectations and setting up the environment in ways that foster students' independence may be successful interventions. Teachers, parents, and caregivers who are fluent in sign language will be key in this effort. In particular, successful deaf role models have much to offer. They provide evidence that success is attainable and they are unlikely to allow deafness itself as an excuse for poor performance. A critical component in fostering growth in this area will be the combined efforts of all those in the child's environment. This will ensure that when a skill is learned in one setting, the child will be expected to use it in other areas as well. Mediating growth to students is also useful. Teachers in our school ask students, at periodic assessments, to reflect on what they are able to do that they could not previously do. Initially a student is likely to reply that the work itself has become easier. The teacher often must demonstrate that the work is actually more complex.

The student perceives it to be easier because of the new skills attained. It can be highly motivating to recognize and "own" this achievement.

Although students who are deaf have traditionally had limited access to much of the general culture, in some ways this is beginning to change. Increasingly they are able to use technological advances such as computers and fax machines on an equal footing with hearing peers. They have benefited from TTYs to use with telephones and from closed captioning of television programs. However the use of this technology presupposes literacy to differing degrees. As our culture moves even more to an information based society, the need increases for students who are deaf to attain higher educational levels and achieve flexibility in problem solving. They must become engaged learners who have the knowledge structures and capacity to continue to change. FIE provides a structured way to address cognitive deficits through increased Mediated Learning Experience and it provides a way to move students toward the goal of becoming active, independent, lifelong learners who are full participants in society.

References

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